

Patent claims

1. A static lamination micro-mixer for mixing, dispersing, emulsifying or suspending at least two fluid phases, characterized in that it contains at least one slotted plate having slot openings and an aperture plate having aperture slots arranged above the former, whose slots are produced as continuous openings.
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2. Micro-mixer according to Claim 1, characterized in that the number of slot openings in the slotted plate and/or the number of aperture slots in the aperture plate is greater than one.
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3. Micro-mixer according to Claims 1 and 2, characterized in that, after entering the slotted plate, the fluid phases are initially fed to one another in the slot openings before they enter the opening of a plate located above.
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4. Micro-mixer according to Claims 1 to 3, characterized in that the slot openings in the slotted plate are arranged in relation to one another in such a way that the fluid phases enter the slot opening of an aperture or slotted plate located above.
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5. Micro-mixer according to Claims 1 to 4, characterized in that the fluid phases come into contact with one another in the slot openings of the aperture plate.
- 25 6. Micro-mixer according to Claims 1 to 5, characterized in that the geometric form and alignment of the slot openings in the slotted plate promote the production of secondary effects.
7. Micro-mixer according to Claims 1 to 6, characterized in that the slot openings are arranged obliquely in relation to one another
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8. Micro-mixer according to Claims 1 to 7, characterized in that the cross section of the slot openings in the plate is configured in the shape of a funnel

or lobe.

- 5 9. Micro-mixer according to Claims 1 to 8, characterized in that a plurality of
 slotted plates and/or aperture plates are arranged directly above one another
 or offset in relation to one another.
10. Micro-mixer according to Claims 1 to 9, characterized in that structures are
 applied to the slotted plates or are machined out of the plates.
- 10 11. Micro-mixer according to Claims 1 to 10, characterized in that, by means of
 suitable arrangement of one or more slotted plates and/or aperture plates, a
 fluid is led to an outlet opening of another fluid.
12. Micro-mixer according to Claims 1 to 11, characterized in that the mixing
15 chamber is fitted above the aperture plate.
13. Micro-mixer according to Claims 1 to 12, characterized in that the aperture
 slots in the aperture plate are offset parallel to one another and/or are
 arranged in a periodic pattern in relation to one another.
- 20 14. Micro-mixer according to Claims 1 to 13, characterized in that the slot
 openings in the slotted plate and the aperture slots in the aperture plate are
 arranged at any desired angle to one another, preferably rotated through 90°.
- 25 15. Micro-mixer according to Claims 1 to 14, characterized in that the slot
 openings in the slotted plate and the aperture slots in the aperture plate have a
 width of less than 500 μm but preferably less than 10 μm .
- 30 16. Micro-mixer according to Claims 1 to 15, characterized in that the slotted and
 aperture plates consist, partly or completely, of metal, glass, ceramic and
 plastic or of a combination of these materials.
17. Micro-mixer according to Claims 1 to 16, characterized in that the slotted and

aperture plates have been produced by punching, embossing, milling, erosion, etching, plasma etching, laser cutting, laser ablation or by the LIGA technique but preferably by laser cutting or the LIGA technique.

- 5 18. Micro-mixer according to Claims 1 to 17, characterized in that the slotted and aperture plates comprise a stack of micro-structured thin plates.
- 10 19. Micro-mixer according to Claim 18, characterized in that the thin micro-structured plates are connected materially by means of soldering, welding, diffusion welding or adhesive bonding or with a force fit by means of screwing, pressing or riveting.
- 15 20. Micro-mixer according to Claims 1 to 19, characterized in that the aperture slots in the aperture plates and the slot openings in the slotting plates are of branched configuration.
- 20 21. Micro-mixer according to Claims 1 to 20, characterized in that the micro-mixer is accommodated in a housing provided for the purpose.
- 20 22. Micro-mixer according to Claims 1 to 21, characterized in that the housing can contain channels which permit spatial distribution of the fluid phases.
- 25 23. Micro-mixer according to Claims 1 to 22, characterized in that the channels are arranged offset parallel from one another, radially, concentrically or behind one another in order to distribute the fluids in the housing.
- 30 24. Micro-mixer according to Claims 1 to 23, characterized in that the channels are designed with constant or variable cross sections in order to distribute the fluids in the housing.
25. Method for mixing, dispersing, emulsifying or suspending at least two fluid phases, characterized in that these are led through at least one slotted plate having slot openings, whose slots are produced as continuous openings, and

an aperture plate having aperture slots arranged above the former.